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In teaching children, a clear understanding of the conceptual content to be taught and an understanding of the linguistic means for conveying that content are necessary for the design of the most effective teaching program. The analysis of any given text for conceptual content must begin with an understanding of the language of the text. One approach to such an understanding is a linguistic analysis of the text. Such an analysis must begin with the identification and classification of the words and structures used in the text. Some classifications which promise to be relevant to the conceptual basis of language are presented, along with criteria for the identification and classification of these surface linguistic components of sentences. (Author)

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SOME SURFACE LINGUISTIC CLASSES WITH CONCEPTUAL RELEVANCE

Charles Jenkins

Assuming the effectiveness of an instructional program is dependent upon an understanding of both the meaning of the conceptual content and the structure of the language for best conveying that content, it is necessary to know how language transmits meaning. An approach to a part of this problem is presented below.

Language is a medium which serves to transmit information. We may assume that such transmission of information is made possible by the fact that the linguistic structures instantiated in language are socially determined common represntations of some common cognitive/conceptual core. This representative function of language is termed its "meaning." The meaings of utterances may be viewed as having two components, "lexical" meaning and "structural" meaning. Lexical meaning is that aspect of the meaning of a lexical item (for present purposes, a lexical item may be regarded to be the same thing as the graphic entity "word") which inheres to it because of its real world referent(s) or the defining characteristics of the set for which the word serves as a label. Roughly speaking, the lexical meaning of a word is the set of properties and identities ascribed to it and implied for it by a dictionary definition. Structural meaning, on the other hand, is that aspect of the meaning of a linguistic entity (be it a word, clause, sentence, paragraph, or whatever) which is determined by the relations it enters into with other linguistic entities in grammatical structures. Lexical meaning, then, is an inherent property of a given lexical item, while structural

meaning is extrinsic, determined by the syntactic structures in which the lexical item can participate.

If we are concerned with the conceptual reflections of linguistic structures, we must first identify linguistic structures. Contemporary (i.e., "transformational-generative") linguistic theory makes the claim that meaning is determined by the underlying structure of sentences. Surface structures, although they may effect the interpretation of the sentence (this is very much of an open question in linguistic theory), are far from sufficient for specifying the meaning of a sentence. It is clear, however, that the actual use of language as a communicative medium depends on surface structures. In this sense we may safely maintain that surface structure is "necessary" to semantic interpretation. An analysis of the surface structure of a sentence is, therefore, a necessary preliminary to discovering the meaning of a sentence (or a word, phrase, clause, etc.). The initial step of such an analysis is the assignment of lexical items to form classes, in agreement with their sentential environment.

Surface syntactic structures are defined in terms of arrays of form classes (as are underlying or "deep" structures). In turn, form classes are defined by their privileges of appearance in syntactic structures. This, clearly, is likely to lead to some circularity in determining the correct analysis for syntactic structure and form classes. There is an extensive literature in the so-called "Structuralist" school of linguistics which attempts to specify rigorous procedures for the discovery of form classes which avoid this potential circularity.

It is nonetheless admitted by many structuralist linguists that the application of discovery procedures is much easier if the applicant already has some intuitions about the structure of the language, that is, if he already has some idea of how his analysis will come out. It will be our assumption in the rest of this paper that the reader has such intuitions. Those interested in a more rigorous and formal approach are referred to Fries (1952).

Some cautionary notes about classification procedures are in order here. First, it is almost never the case that a word is uniquely a member of one form class. The same surface lexical item may serve as both a noun and as a verb, as in (1) and (2).

1) The water flowed slowly.
2) Water the dog, Seymour.

Or, a member of the form class Noun may serve as an adverbial, as in (3) and (4).

3) Yesterday was Beethoven's birthday.
4) Yesterday, Beethoven had a birthday.

There is no lack of examples of this, and so it must be understood that any classification of a word (in fact, any structural classification of any linguistic entity) is only valid with regard to a given specific usage of that word. That is, a classification of a word will not be a statement of the form class of that word, but rather a statement about the word's potential form class membership. Form classes do not exist independent of syntactic structures. It follows from this that any set of proposed form classes does not necessarily entail that the proposed form classes are mutually exclusive categories of classification. Thus,

any given word may be a potential member of more than one form class and of more than one subcategory of a form class.

Further, in using the classification technique of sentential frames utilized below, it is necessary to be aware of the problems associated with the notion of "acceptability" or "grammaticality." In using this technique, the word to be classified is inserted into a sentence "frame" and a native speaker judges whether the resulting structure is "grammatical" or "acceptable" (or "good," "bad," "funny," or any of a number of similar terms of judgment). In some cases, it is difficult to determine the reason for a judgment of acceptability or unacceptability. The most obvious grounds for the rejection of a syntactic structure is failure to conform with the rules governing allowable surface structures of English, e.g., the famed Chomsky (1957) example in (5).

5) *Furiously ideas green sleep colorless.

A more subtle grounds for rejection is failure to observe the rules governing selectional restrictions in English, e.g., the famed nonsentence (Chomsky, 1957) in (6).

6) *Colorless green ideas sleep furiously.

Such a sentence would be rejected on the grounds of semantic anomaly, but not on syntactic grounds, as it follows the allowable syntactic pattern of Adj-Adj-N-V-Adv. Because of violations of semantic restrictions, the sentence sounds "funny" to most speakers of English, however, as demonstrated by Hill (1961), many speakers of English will accept it and attempt to interpret it. Stylistic devices of English, such as "personification," frequently allow the violation of certain semantic

selectional restrictions on what form-classes are "grammatical" in what environments. Sentence (6) is an example of a type of sentence that we would like to reject as "ungrammatical" in the context of the sentential frames below, even though it may be interpretable and it obeys the gross surface structure rules of English. Most cases of such judgments will be much more subtle than that involved in judging (6) to be "funny," and a good deal of linguistic sophistication might be necessary to make such a judgment. In the absence of the required linguistic training, the best heuristic device available to the classifier is to pay close attention to his own mental processes. If he finds that he has to "stretch" to interpret the structure, it should probably be rejected. One's immediate reaction to a structure is a more reliable index to the acceptability of a structure, frequently, than a considered reaction. However, it must also be kept in mind that it is almost impossible to construct the perfect all-purpose sentence frame, and that some sentences may be "funny" due to semantic violations irrelevant to the classificatory distinction being tested. In such cases, suggestions will be made about appropriate variations of the criterial frame, and in all cases, examples will be given to try to make the relevant features of the frame more readily apparent.

The analysis adopted here posits four major productive form-classes of English, and one non-productive, finite form class. These classes are Nouns, Verbs, Adjectives, Adverbs, and "Function Words" respectively. This is not the only possible analysis of major form-classes that one could adopt, however (see Fries, 1952). This analysis has been selected

because it posits form-classes which are, by and large, familiar to almost everyone and for which intuitions are about as reliable as more rigorous discovery procedures. Furthermore, although there is no formal demonstration for it, the major form-classes posited by this analysis seem to correspond to some gross but basic conceptual distinctions (which is undoubtedly why these "traditional" form-classes were originally proposed). For instance, although we cannot accept the definition of traditional grammars that a noun is "the name of a person, place, or thing" we cannot deny that there seems to be a semantic objectivity or "thingness" about lexical items used as members of the form-class "Noun." Similarly for the other productive major form-classes, and the class of Function Words appears to have a common conceptual basis as signifiers of semantic and syntactic relations among members of the productive form-classes.

Form-classes are defined both intensively and extensively. The criteria for these two types of definitions are co-occurrence privileges and substitutability, respectively. The form class as a whole is defined intensively by the co-occurrence environments (or sentence frames) which it can enter into. It is defined extensively by the list of its members, which is determined by the substitutability of words into the defining sentence frames. The major form classes are defined intensively in terms of the other major form classes, and there exist "discovery procedures" for rigorously defining them extensively (see Francis, 1958, for example). Such rigor, however, far exceeds the needs of an analysis for conceptual content, such as proposed here. For present purposes,

intuitions gained from instruction in traditional grammars as to what constitutes a "noun," "verb," etc., are sufficient to determine form-class potential membership. More important for a structural analysis for conceptually relevant structures are certain of the proposed subclasses of the major form classes. The frames which determine the membership of these subclasses depend critically on co-occurrence with intuitively determined (not rigorously defined) subcategories of other form classes. For instance, the Noun subclass of "Human" nouns is defined by co-occurrence with verbs which only humans are capable of performing. The class of such verbs is certainly linguistically ill-defined, if not scientifically ill-defined.

In summary then, certain categories will be proposed below for a surface structure level analysis of lexical items. The analysis will determine potential form-class and form-class subcategory membership of lexical items. The form-classes and subcategories proposed for this analysis have been selected from the set of all possible form-classes and subcategories as being among those with possible relevance to basic conceptual-cognitive categories. Syntactic frames are proposed for determining class and subcategory membership. A list of some of the subcategories of Function Words and of partial subcategory membership is also presented. The criterial frames have been taken, in part, from Fries (1952), Francis (1958), and Menzel (1968). Following standard linguistic practice, asterisks mark unacceptable example sentences.

NOUNS

Nouns seem to be one of the most basic of the form classes. The classification of a sentence into NP (noun and its adjuncts) and VP

(verb and its adjuncts, which may also include NP) is the earliest stage of the phrase structure analysis of a sentence, which lends support to this contention.

PROPER OR COMMON

A noun which fits into the following frames is a common noun. The noun must fit both frames. All which do not are proper nouns.

The _____ is big. A(n) _____ is big.	(Other adjectives may be substituted for big to avoid semantic anomaly)

Examples: The aardvark is big.
An aardvark is big.

The snow is cold. *A snow is cold.	(Violates mass/count test (see below), but should pass proper/common test... this is an example of some of the difficulties encountered in making judgments on the correct grounds)
The Mississippi is big. *A Mississippi is big.	(This is a genuine proper noun)

MASS OR COUNT

This is an extremely difficult classification to make. There are readings of the noun phrases for which the frames do not give the correct results, as pointed out in Mendel (1968). This is due in part to the transformational history of the criterial adjective for mass nouns. Many is normally inserted as a lexically unitary quantifier in the underlying form of the sentence. It may, however, be transformationally derived from an underlying form similar in meaning to the phrase many kinds of, in which case it will not be criterial for mass nouns. Many, in the frames below, is not meant in the sense "many kinds of." Similarly, it is possible to interpret count nouns in a distributive

sense, which would lead to incorrect classification of count nouns as mass nouns. Keeping these warnings in mind, if a noun works in the first frame, but not the next two, it is a mass noun. If it does not fit into the first frame, but does fit the next two, it is a count noun. All generic terms are mass nouns, when used in their generic sense. When used to denote one or more members of the genera as opposed to the entire class, the generic term will be a count noun.

Much _____ is green.
(singular)

Many _____ are green.
(plural)

A _____ is green.
(singular)

Examples:

*Much horse is green.
Many horses are green.
A horse is green.

Much water is green.
?Many waters are green.
*A water is green.

ABSTRACT OR CONCRETE

This frame also is subject to misinterpretation, as it is possible to violate the semantic restriction that is criterial for stylistic effect. Nouns which fit this frame are concrete nouns.

I hit the _____ with a sledgehammer.

Examples:

I hit the horsecollar with a sledgehammer.
*I hit the idea with a sledgehammer.

ANIMATE OR INANIMATE

Again, the criterial semantic restriction defining this frame may be violated for stylistic reasons. Such violations, as all other

stylistic-based violations to which these frames are subject, should be readily apparent to the native speaker. Nouns fitting this frame should be considered animate.

The _____ ate a bagel.

Examples:

The amoeba ate a bagel.
*The knish ate a bagel.

HUMAN OR NONHUMAN

Personification is a common literary device which should be watched out for in this frame. Nouns fitting the frame should be considered human nouns.

The _____ telephoned home.

Examples:

The yenta telephoned home.
*The amoeba telephoned home.

MASCULINE, FEMININE, NEUTER, OR INDETERMINATE

It is an oft-noted fact that English grammatical gender does not necessarily agree with biological gender. It is reflected syntactically in the pronoun system of the language. The distinction between neuter gender and indeterminate gender is linguistically significant, but may not be conceptually significant. Nouns fitting the first frame are masculine, the second frame identifies feminine nouns, the third frame indicates neuter nouns. Nouns fitting more than one frame are indeterminate.

The _____ lost his way.
The _____ lost her way.
The _____ lost its way.

(Other nouns may be substituted in the object position to avoid semantic anomaly, the pronoun is the important part of this frame)

Examples:

The father lost his way.
The wife lost her way.
The computerized automobile lost its way.
The baby lost his/her/its way.

STATIVE OR ACTIVE

That nouns, as well as adjectives and verbs can be categorized as stative and active is pointed out by Chomsky (1970). It appears that the nouns for which this subcategorization is relevant are all members of the subclass Animate nouns. Nouns which fit the frame are active (or, perhaps better, activity) or non-stative nouns.

Be a _____.	(An effective alternate frame is "He (it) is being a _____.", since the imperative frame may be semantically restricted to Human nouns)

Examples:

Be a hero.	(He is being a football player.)
Be a football player.	(*He is being a person.)
*Be a person.	(It is being a nuisance.)
	(*It is being an aardvark.)

EVENT OR ATTRIBUTE

The distinction here seems to be semantically very similar to that between Stative and Active nouns, if not the same. It appears that the nouns for which this subcategorization are relevant are all Inanimate nouns. Nouns which fit the frame are Event nouns.

The _____ was last year.	(Other appropriate time expressions may be substituted for "last year" to avoid such semantic anomalies as: "*The century was last year."--for example: "The century was last millenium.")

Examples:

The class was last year.
The party was last year.
*The aardvark was last year.
*The hero was last year.
*The independence was last year.

VERBS

The analysis considers verbs to be relational terms or functions which relate nominal elements (Nouns). The specific nature of the relation is the lexical meaning of the verb, and the structural meaning is the relational nature of the function. Thus, the basic verbal categorizations involve aspects of the relation such as number of related items, transitivity, reflexivity, etc., of the relations. Less basic to the structural meaning, but nonetheless conceptually significant is the basic category of Stative or Process.

TRANSITIVE OR INTRANSITIVE

This distinction determines verbs which are necessarily single argument predicates from relations which involve more than one argument. Difficulty arises because some transitive verbs may be used intransitively, that is, they may appear to have no object, thus seeming to be one term predicates. The following frames have been designed to establish three categories of verbs, those which are obligatorily intransitive, those which are obligatorily transitive, and transitive verbs which may be used intransitively. There may be a fourth class of verbs, those which are functions relating more than two terms. I have not been able to discover any which could not also be expressed as an embedding of two term relationships, but would not deny the possibility that such a

fourth class of verbs may exist. In the following frames, intransitive verbs will fit the first frame but not the second. Obligatorily Transitive (i.e., must be explicitly two term) verbs will fit the second frame but not the first. Transitive verbs which may be used intransitively will fit both frames.

Algernon _____.
Algernon _____ something, but I don't know what.

Examples:

Algernon thinks.
Algernon thinks something, but I don't know what.

Algernon stinks.
*Algernon stinks something, but I don't know what.

*Algernon expected.
Algernon expected something, but I don't know what.

STATIVE OR PROCESS

This distinction is also called stative/nonstative, and seems to be a very basic semantic category, existing for nouns, verbs, and adjectives. Two frames are presented here. Either will separate the statives (verbs which do <u>not</u> fit the frames) from the process or nonstative verbs (which will fit the frames). Care should be taken to use only <u>verbs</u> and not whole verb phrases in the frames. The first frame tends to be more generally useful.

Winifred _____ and Pancho Villa does it too.
I am _____ing. (This frame helps make clear that it is the verb and not the verb phrase that is being tested. Other nouns or pronouns may be substituted for "I.")

Examples:

Winifred thinks and Pancho Villa does it too.
I am thinking.

*Winifred knows and Pancho Villa does it too.
*I am knowing.

?Winifred knows a yenta and Pancho Villa does it too.
*I am knowing a yenta.

ADJECTIVES

Adjectives may be classified into the same categories as nouns. They share the same semantic features (i.e., are categorized the same) as the head noun of the NP. Adjectives, however, are classified negatively, in terms of what classes they may not belong to.

MASS OR COUNT

Adjectives fitting the first frame only are mass adjectives. Adjectives fitting the second frame only are count adjectives. Most adjectives will fit both frames, and are thus not restricted to the mass or count classification.

The _____ water...
The _____ banana(s)...

Examples:

*The numerous water...
The numerous bananas...

The extensive water...
*The extensive banana...

The obscene water...
The obscene banana...

ABSTRACT OR CONCRETE

Adjectives not fitting any of the following frames are concrete adjectives, restricted to use with concrete nouns.

The _____ February...
The _____ thought...
The _____ Bank (in the institutional sense)

Examples:

*The tall February...
*The nihilistic February...
*The influential February...
The wet February...

*The tall thought...
The nihilistic thought...
The influential thought...
*The wet thought...

*The tall Bank...
*The nihilistic Bank...
The influential Bank...
*The wet Bank...

The tall concrete slab...

ANIMATE OR INANIMATE

Adjectives not fitting the following frame will be animate.

The _____ box...

Examples:

The brown box...
*The quick box...
The quick brown fox...

HUMAN OR NONHUMAN

Adjectives not fitting the following frame are nonhuman.

The _____ person...

Examples:

*The platinum person...
The talkative person...
The platinum box...

MASCULINE, FEMININE, OR INDETERMINATE

Adjectives not fitting the first frame are not masculine. Adjectives not fitting the second frame are not feminine.

The _____ man...
The _____ woman...

Examples:

The handsome man...
*The buxom man...

*The handsome woman...
The buxom woman...

The endomorphic man...
The endomorphic woman...

STATIVE OR NONSTATIVE

There are two frames for testing this distinction. The first frame is a test of predicate adjectives. The next two frames constitute the test for prenominal adjectives. If the adjective fits the first frame, or if it fits <u>both</u> the other frames, it is a nonstative adjective.

He is being _____ now. (Other nouns or pronouns may be substituted for "he")

The thing was _____ {-en / -ed} by Ermintrude.

It's a(n) _____ thing. (In these two frames other nouns may be substituted for "thing" and/or for "Ermintrude")

Examples:

*He is being fat now.
?It is being broken now.
He is being erudite now.

*The thing was fatted by Ermintrude.
The thing was broken by Ermintrude.
*The thing was erudited by Ermintrude.

It's a fat thing.
It's a broken thing.
*It's an erudite thing.

fat = stative
erudite = stative
broken = nonstative

ADVERBS

Adverbs remain as a sort of catch-all major form class. Adverbs may be roughly defined as those elements of a sentence which can appear after the nouns which are the direct and indirect objects of the verb (if the verb takes direct and/or indirect objects). Frames for sub-classifying adverbs and adverbial phrases are, to all intents and purposes, impossible. Many adverbials are prepositional phrases. There are some traditional categories for adverbs and adverbials which do seem to have conceptual content, such as manner adverbials (e.g., quickly, with ease, distractedly), agent adverbials (e.g., by someone, by Cuthelbert), instrumental adverbials (e.g., with an axe, with a fountain pen), adverbs of time--both durative (e.g., for weeks, monthly) and immediate (e.g., now, last year), and adverbs of place--both locative (e.g., here, at home) and directional (e.g., whither, to the office). Such classification categories seem to exist most clearly in the native speaker's mind because of mutual substitutability without great semantic damage resulting, rather than because of some defining syntactic frame. This being the case, adverbs are best classified in accord with intuitive feelings about their function in the sentence.

FUNCTION WORDS

There is one other form class of English besides Nouns, Verbs, Adjectives, and Adverbs, the non-productive (closed) class referred to as "Function Words." This class of lexical items serves as one of the signals of certain kinds of syntactic or grammatical relations. Some of the function words have a certain amount of obvious semantic content (such as "in," "above," "on," etc.), while others have very deep and abstract semantic content or lexical meaning, if any at all (such as "to" in "to see"). The class of function words is, in principle, exhaustively denumerable. Francis (1958) recognizes eight subcategories of function words, and a few which seem to be sui generis. The eight major subcategories are given below. A list indicating membership of each subcategory is given. The lists are extensive, but undoubtedly not exhaustive.

TYPE 1: NOUN DETERMINERS

the	a/an	my	your
his	her	their	our
this/these	that/those	many (a)	its
more	several	both	all
some	every	(a) few	other

and all numerals

TYPE 2: AUXILIARIES (VERBAL DETERMINERS)

be	do	have	can/could
may/might	will/would	shall/should	must
dare	(had) better	need (to)	have (to)
get (to)	used (to)	be going (to)	keep (on)

TYPE 3: QUALIFIERS

very	quite	rather	pretty
mighty	somewhat	too	a bit
a little	so	more	most
less	least	indeed	enough
no	still	much	lots (of)
a (whole) lot	a (great/good) deal	even	real
awful	some	right	plenty

TYPE 4: PREPOSITIONS

at	by	for	from
of	on	to	with
over	up	across	after
as	down	like	near
off	out	per	round
since	through	till	under
about	above	along	amid
among	around	before	behind
below	beneath	beside	between
beyond	despite	during	except
toward	underneath	unlike	until
unto	against	concerning	considering
opposite	regarding	across from	along with
alongside of	apart from	away from	back of
down from	due to	except for	inside of
instead of	into	off of	onto
out of	outside of	over to	throughout
together with	upon	up to	up with
within	without	in regard to	on account of
in spite of	by means of	in addition to	in front of
on top of	in behalf of	on behalf of	

TYPE 5: COORDINATORS

(The scope of this class includes constituents as well as clausal and sentential coordination.)

and	but	nor	not
or	rather than	as well as	together with
along with	not (only)...but (also)		

A subclass given the special name "Correlatives"

either...or	neither...nor	both...and

TYPE 6: INTERROGATORS

what	when	where	how
why	who/whom/whose	which/whose	whoever/whomever
whichever	whatever	whenever	wherever
however	why...ever	whither	whence

Of these, there is a special subclass termed "Interrogative Pronouns."

who/whom/whose	which	what

TYPE 7: "SIMPLE INCLUDERS"

This class seems to be defined on its function as a signal of a subordinate clause and/or an embedded sentence. It may be further subdivided into two categories, relative pronouns and (subordinating) conjunctions.

<u>Relative Pronouns</u>

who/whose/whom	which	what	that
when	where	whoever/whosever/whomever	
whichever	whatever/whatsoever		

Conjunctions

after	although	as	as if
as though	because	before	but that
but what	except (that)	for	how(ever)
in case	in order that	if	if ever
if only	lest	like	now (that)
once	only	provided (that)	since
so (that)	such that	than	that
though	till	unless	until
when	whenever	where	wherever
what if	what though	whether...or	while
whilst	whither	why	

as	close far long near often soon	as
so		

TYPE 8: "SENTENCE LINKERS"

The scope of these conjunctions is strictly limited to sentences, unlike the more basic class that makes up Type 5 function words.

accordingly	afterwards	also	before
else	father (on)	further	hereafter
heretofore	later (on)	likewise	nearby
otherwise	still	then	there

thereafter	thereupon	too	thus
consequently	furthermore	hence	however
moreover	nevertheless	therefore	at least
in the first (next) place		in addition	on the other hand
for example	in contrast	in fact	as a result
after a while			

In addition to these major categories of the function word class, we should include the sui genens case of the existential "there" as in: there is/there are.

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